

## **REMARKS**

In the Office Action mailed on February 9, 2006, claims 21-37, 43-49 and 51 were pending. Claim 48 was withdrawn from consideration because the Examiner found it to be directed to a non-elected species. Claims 21-37, 43-47, 49 and 51 were rejected.

### **I. Rejection under 35 U.S.C. § 102**

In the Office Action at page 3, number 5, claims 21-37, 43-47, 49 and 51 were rejected under 35 U.S.C. §102(e) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 5,589,280 ("Gibbons"). The Examiner stated that due to the identical method of producing the metal film taught by Gibbons, compared to the claimed method, it is the Examiner's position that the article of the applied prior art is identical to or only slightly different than the claimed article. Applicants respectfully traverse this rejection.

#### **A. The Present Invention**

The present invention as recited in claim 21 is a coated product comprising a substrate; a film sputtered from a metal cathode target in an atmosphere comprising inert gas and reactive gas, the metal in the metal cathode target having a reactive gas switch point, wherein the concentration of the reactive gas during sputtering is below the reactive gas switch point such that the metal target is sputtered in a metallic mode to deposit a metal film having an amorphous structure defined as an amorphous metal film; and a second metal oxide film over the amorphous metal film, wherein the amorphous metal film is oxidized to form a first metal oxide film in the coated product.

The present invention as recited in claim 43 is a coated article comprising a glass substrate, a first titanium oxide film formed by thermally oxidizing an amorphous sputtered titanium metal film deposited from a titanium metal cathode target in an atmosphere comprising argon and oxygen below a reactive switch point of the titanium metal cathode target, and a second titanium oxide film deposited over the first titanium oxide film.

The present invention as recited in claim 51 is a coated product comprising a substrate; and a metal oxide film comprised of crystalline metal oxide from oxidation of an essentially amorphous metal film sputtered from a metal cathode target in an atmosphere comprising inert gas and reactive gas, the metal in the metal cathode target having a reactive gas switch point, wherein the concentration of the reactive gas during sputtering is below the reactive gas switch point such that the metal target is sputtered in a metallic mode to deposit a metal film having an amorphous structure; and a metal oxide film directly over the crystalline metal oxide film, where the metal oxide film is deposited by reactive sputtering of amorphous metal oxide over the amorphous metal film.

#### **B. Gibbons**

Gibbons discloses a plastic substrate with layers of functional metals having an oxide heat of formation that is greater than -40,000 calories/gram atom of metal, such as silver, copper, gold, and the like, and a thin layer of a metal having an oxide heat of formation of less than -50,000 calories/gram atom of metal is present as an adhesion-promoting primer layer.

### C. Traversal of the Rejection

For a proper rejection under 35 U.S.C. § 102, the cited reference must disclose each and every limitation of the invention. The present invention as recited in amended claim 21 is a coated product comprising **a second metal oxide film** over the amorphous metal film, wherein the amorphous metal film is oxidized to form **a first metal oxide film** in the coated product. The resulting coated product has a **second metal oxide film over a first metal oxide film**.

In contrast to the present invention, Gibbons discloses a plastic substrate having a primer layer made up of a pure metal or a partially oxidized metal and a **metal layer over the primer layer**. Gibbons teaches that the primer improves adhesion between a metal layer and a plastic substrate over which it is applied.

In the "Response to Arguments" section in the Office Action, the Examiner has apparently confused the layers disclosed in Gibbons. The Examiner states that "the layer may be oxidized before or after depositing the metal". The referenced language refers to the primer layer; not the functional metal layer. Gibbons must include a metal layer over the substrate.

For the reasons described above, Gibbons teaches a metal layer over a metal layer or a metal layer over a metal oxide layer, but Gibbons does not disclose a coated product having **a second oxide film over a first oxide film** as recited in claim 21. As a result, Gibbons does not disclose each and every limitation in the claim and does not anticipate the present invention as recited in claim 21. Applicants respectfully request the withdrawal of this rejection.

Claims 22-35, 44-47 and 49 directly or indirectly depend on claim 21 and recite the present invention in varying scope. Applicants have discussed above how claim 21 is not anticipated by over the cited reference, and claims 22-35, 44-47 and 49 are similarly not anticipated by Gibbons. Specifically, Gibbons does not disclose a coated product having a second oxide film over a first oxide film as recited in claim 21, further limited by claims 22-35, 44-47 and 49. As a result, Applicants respectfully request the withdrawal of this rejection.

The present invention as recited in amended claim 43 is a coated article comprising **a second titanium oxide film deposited directly over the first titanium oxide film**. In contrast to the present invention, Gibbons discloses a plastic substrate having primer layer made up of a pure metal or a partially oxidized metal and a **metal layer directly over the primer layer**. Based on the teachings in Gibbons, titanium oxide cannot be both the metal layer and the primer layer in light of the way the respective layers are defined. More specifically, Gibbons teaches that the layers must be different materials since (a) the functional metals are defined as having an oxide heat of formation that is greater than -40,000 calories/gram atom of metal, such as silver, copper, gold, and the like, and (b) the thin layer of metal (i.e., the adhesion-promoting primer layer) is defined as having an oxide heat of formation of less than -50,000 calories/gram atom. As a result, Gibbons teaches that the “functional metal” and the “thin layer of metal” primer cannot be the same material.

Since claim 43 teaches first and second metal oxides of the same material and Gibbons teaches that the materials cannot be the same, Gibbons

cannot disclose each and every limitation of claim 43 and does not anticipate the claim 43. Applicants respectfully request the withdrawal of this rejection.

Similar to claim 43, claim 51 recites a coated product having a **metal oxide film directly over a crystalline metal oxide film**, where the metal oxide film is deposited by reactive sputtering of amorphous metal oxide over the amorphous metal film. For the reasons discussed above, Gibbons does not disclose a coated substrate having a **metal oxide film deposited directly over a crystalline metal oxide film** as recited in claim 51. As a result, Gibbons does not disclose each and every limitation of claim 51 and does not anticipate the claim. Applicants respectfully request the withdrawal of this rejection.

Claims 36 and 37 depend on claim 51 and recite the present invention in varying scope. Applicants have discussed above how claim 51 is not anticipated by over the cited reference, and claims 36 and 37 are similarly not anticipated by Gibbons. As a result, Applicants respectfully request the withdrawal of this rejection.

## II. Rejection under 35 U.S.C. § 103

### A. Rejection of Claims 21-37, 43-47, 49 and 51 over U.S. Patent No. 5,589,280 ("Gibbons")

This rejection is discussed in detail above. For a proper rejection under 35 U.S.C. § 103, the PTO must satisfy three requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. See In re Fine, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. See Amgen, Inc., 927 F.2d 1200, 1209, 18 U.S.P.Q.2d 1016, 1023 (Fed Cir. 1991). Lastly, the prior art reference or combination of references must teach or suggest all the limitations of the claims. See In re Wilson, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

The present invention as recited in amended claim 21 is a coated product comprising a **second metal oxide film** over the amorphous metal film, wherein the amorphous metal film is oxidized to form a **first metal oxide film** in the coated product. The resulting coated product has a second metal oxide film over a first metal oxide film.

In contrast to the present invention, Gibbons teaches a plastic substrate having a primer layer made up of a pure metal or a partially oxidized metal between the plastic substrate and a **metal layer**. Gibbons further teaches that the primer layer promotes adhesion between the metal layer and

the plastic substrate. Because a metal layer and a metal oxide layer have different properties, it would not be obvious to replace the metal layer in Gibbons with a metal oxide layer.

As a result, Gibbons does not teach or suggest all the limitations of claim 21, and claim 21 is patentably distinguishable over Gibbons.

Applicants respectfully request the withdrawal of this rejection.

Claims 22-35, 44-47 and 49 directly or indirectly depend on claim 21 and recite the present invention in varying scope. Applicants have discussed above how claim 21 is patentably distinguishable over the cited reference, and claims 22-35, 44-47 and 49 are similarly patentably distinguishable over Gibbons. As a result, Applicants respectfully request the consideration and allowance of claims 22-35, 44-47 and 49.

The present invention as recited in amended claim 43 is a coated article comprising a second titanium oxide film deposited directly over the first titanium oxide film. In contrast to the present invention, Gibbons teaches a plastic substrate having primer layer made up of a pure metal or a partially oxidized metal and a **metal layer over the primer layer**. For the reasons discussed above, not only doesn't Gibbons teach or suggest two successive layers of titanium oxide, but based on how the functional metal layer and the primer layer in Gibbons are defined, Gibbons further teaches that the two layers cannot be the same material.

As a result, the present invention as recited in claim 43 is patentably distinguishable over Gibbons, and Applicants request the withdrawal of this rejection.

Similar to claim 43, claim 51 recites a coated product having **a metal oxide film directly over the crystalline metal oxide film**, where the metal oxide film is deposited by reactive sputtering of amorphous metal oxide over the amorphous metal film. For the reasons discussed above, Gibbons does not teach or disclose, either implicitly or explicitly, a coated product having a **metal oxide film deposited directly over a crystalline metal oxide film** as recited in claim 51. Gibbons teaches a coated substrate having a metal layer over a metal or metal oxide primer layer. As a result, the present invention as recited in claim 51 is patentably distinguishable over Gibbons, and Applicants request the withdrawal of this rejection.

Claims 36 and 37 depend on claim 51 and recite the present invention in varying scope. Applicants have discussed above how claim 51 is patentably distinguishable over the cited reference, and claims 36 and 37 are similarly patentably distinguishable over Gibbons. As a result, Applicants respectfully request the withdrawal of this rejection.

**B. Rejection of Claim 37 over Gibbons in view of U.S. Patent No. 4,188,452 (“Groth”)**

In the Office Action at page 7, number 6, claim 37 is rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons as applied to claims 21-37, 43-47, 49 and 51 above and further in view of Groth. The Examiner stated that Gibbons does not mention a thermal oxidation temperature range, but it would have been obvious to one having ordinary skill in the art at the time the invention was made to thermally oxidize at a temperature between 400°C and 500°C as taught by Groth. Applicants respectfully traverse this rejection.



## 1. Groth

Groth discloses a heat reflecting pane comprising a substantially transparent glass substrate which has a layer of silicon oxide thereon and a layer of titanium dioxide in the rutile form on the side of the silicon oxide layer remote from the glass pane, wherein the glass substrate having been toughened by heat treatment. The pane is formed by coating the glass substrate with a thin layer of silicon oxide, then applying a layer of titanium to the silicon oxide layer by vacuum deposition and oxidizing the titanium at over 550°C to form titanium oxide in the rutile form.

## 2. Traversal of the Rejection

The proper rejection for a §103 rejection is shown above. As discussed above, claim 37 depends indirectly from claim 51 and recites the present invention in varying scope. Applicants have discussed above how claim 51 is patentably distinguishable over Gibbons. The reasons discussed above also distinguish the invention as recited in claim 37 over Gibbons in view of Groth. Specifically, there is no teaching or disclosure, either implicitly or explicitly, of a coated substrate having a **metal oxide film deposited directly over a crystalline metal oxide film**. Gibbons teaches a coated substrate having a metal layer over a metal or metal oxide primer layer. Because a metal layer and a metal oxide layer have different properties, there is no teaching or suggestion to replace the metal layer in Gibbons with a metal oxide layer. Therefore, claim 37 is patentably distinguishable over Gibbons in view of Groth, and Applicants respectfully request the withdrawal of this rejection.

### C. Rejection of Claims 21-52 over Gibbons in view of U.S.

#### Patent No. 4,522,844 ("Khanna")

In the Office Action at page 7, number 7, claims 21-37, 43-47, 49 and 51 were rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Khanna. The Examiner stated that Gibbons does not specifically mention whether the film is amorphous, but it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the metal film amorphous as taught by Khanna. Applicants respectfully traverse this rejection.

#### 1. Khanna

Khanna discloses a method of coating a substrate with an amorphous metal comprising the step of bombarding a solid piece of the metal with ions of an inert gas in the presence of a magnetic field to provide a vapor of the metal which is deposited on the substrate at a sufficiently low gas pressure so that there is formed on the substrate a thin, uniformly thick, essentially pinhole-free film of the metal.

#### 2. Traversal of the Rejection

The proper rejection for a §103 rejection is shown above. The present invention as recited in amended claim 21 is a coated product comprising a **second metal oxide film** over the amorphous metal film, wherein the amorphous metal film is oxidized to form a **first metal oxide film** in the coated product. The resulting coated product has a second metal oxide film over a first metal oxide film.

In contrast to the present invention, Gibbons teaches a plastic substrate having a **metal layer** over a primer layer made up of a pure metal or

a partially oxidized metal. The Examiner uses Khanna to teach the primer is an amorphous metal film. But there is no teaching in Khanna of a metal oxide film over an amorphous metal primer film.

Therefore, Gibbons in view of Khanna does not teach or disclose, either implicitly or explicitly, a coated product having a **second oxide film over a first oxide film** as recited in claim 21. As a result, claim 21 is patentably distinguishable over Gibbons in view of Khanna, and Applicants respectfully request the withdrawal of this rejection.

Claims 22-35, 44-47 and 49 directly or indirectly depend on claim 21 and recite the present invention in varying scope. Applicants have discussed above how claim 21 is patentably distinguishable over the cited references, and claims 22-35, 44-47 and 49 are similarly patentably distinguishable over Gibbons in view of Khanna. As a result, Applicants respectfully request the withdrawal of this rejection.

The present invention as recited in amended claim 43 is a coated article comprising a second titanium oxide film deposited directly over the first titanium oxide film. In contrast to the present invention, Gibbons teaches a plastic substrate having a metal layer over a primer layer made up of a pure metal or a partially oxidized metal. Further, as discussed above, according to the teaching in Gibbons the metal layer and the primer layer cannot be comprised of titanium oxide due to the way the layers are defined. The Examiner uses Khanna to teach the primer can be an amorphous metal film.

Hence, a combination of Gibbons and Khanna teaches a metal layer over an amorphous metal layer but does not teach or suggest a coated article having **second titanium oxide film deposited directly over a first titanium**

**oxide film** as recited in claim 43. As a result, the present invention as recited in claim 43 is patentably distinguishable over Gibbons in view of Khanna, and Applicants respectfully request the withdrawal of this rejection.

Similar to claim 43, claim 51 recites a coated product having a **metal oxide film directly over the crystalline metal oxide film**, where the metal oxide film is deposited by reactive sputtering of amorphous metal oxide over the amorphous metal film. For the reasons discussed above, Gibbons in view of Khanna does not teach or disclose a coated product having a **metal oxide film deposited directly over a crystalline metal oxide film** as recited in claim 51. As a result, the present invention as recited in claim 51 is patentably distinguishable over Gibbons in view of Khanna, and Applicants respectfully request the withdrawal of this rejection.

Claims 36 and 37 depend on claim 51 and recite the present invention in varying scope. Applicants have discussed above how claim 51 is patentably distinguishable over the cited references, and claims 36 and 37 are similarly patentably distinguishable over Gibbons in view of Khanna. As a result, Applicants respectfully request the withdrawal of this rejection.

**D. Rejection of Claim 37 over Gibbons in view of Khanna and further in view of Groth**

In the Office Action at page 11, number 8, claim 37 was rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Khanna as applied to claims 21-52 and further in view of Groth. The Examiner stated that Gibbons does not mention a thermal oxidation temperature, but it would have been obvious to one having ordinary skill in the art at the time the

invention was made to thermally oxidize at a temperature between 400°C and 500°C as taught by Groth.

The proper rule for a rejection under 35 U.S.C. §103 is shown above. As discussed above, claim 37 depends on claim 51 and recites the present invention in varying scope. Applicants have discussed above how claim 51 is patentably distinguishable over Gibbons in view of Groth and Gibbons in view of Khanna. The reasons discussed above also distinguish the invention as recited in claim 37 over Gibbons in view of Khanna and further in view of Groth. Specifically, there is no teaching or disclosure, either implicitly or explicitly, of a coated substrate having a **metal oxide film deposited directly over a crystalline metal oxide film**. The combination of the cited references teaches a metal layer over a primer layer. As a result, Applicants respectfully request the withdrawal of this rejection.

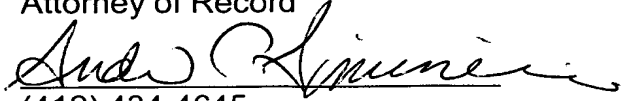
### III. CONCLUSION

In light of the remarks presented in this correspondence, Applicants respectfully request the withdrawal of the following rejections: the rejection of claims 21-37, 43-47, 49 and 51 under 35 U.S.C. §102(e) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Gibbons; the rejection of claim 37 under 35 U.S.C. §103(a) as being unpatentable over Gibbons as applied to claims 21-37, 43-47, 49 and 51 above and further in view of Groth; the rejection of claims 21-37, 43-47, 49 and 51 under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Khanna; the rejection of claim 37 under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Khanna as applied to claims 21-37, 43-47, 49 and 51 and further in view of Groth; and allowance of claims 21-37, 43-47, 49 and 51.

If any questions remain about this application, the Examiner is requested to contact Applicants' attorney at the telephone number provided below.

Respectfully submitted,

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